

What is claimed is:

1. A method for managing location information on a mobile station on an object by  
5 a server on a mobile network comprising the steps of:

said server obtaining and storing correspondingly object identifying information for  
identifying said object and mobile identifying information for identifying said mobile  
station;

obtaining, from a traffic control device which controls movement of said object, object  
10 movement information of said object identified by the object identifying information;  
converting said movement information into a location area information; and  
managing location of said mobile station on the basis of said location area  
information.

2. A method for managing location information on a mobile station on an object by a  
15 server on a mobile network comprising the steps of:

upon receiving object identifying information for identifying said object from a  
transmitting device provided in said object, said mobile station transmitting to said  
server received object identifying information and mobile identifying information for  
20 identifying said mobile station;

said server receiving and storing correspondingly said object identifying information  
and said mobile identifying information;

obtaining, from a traffic control device which controls movement of said object, object  
movement information of said object identified by the object identifying information;

25 converting said movement information into a location area information; and  
managing location of said mobile station on the basis of said location area  
information.

3. The method of claim 2, wherein upon receiving a call for said mobile station, said

1006379 03301  
"05220" 26/23001

server inquires about said movement information for said traffic control device.

4. The method of claim 2, wherein upon detecting movement of said object, said traffic control device notifies said server of said movement information.

5

5. A method for communication in a communication system comprising: a server on a mobile network for communication with a mobile station; and a traffic control device for controlling an object comprising the steps of:

10

said server obtaining mobile identifying information for identifying said object and object identifying information for identifying said mobile station;

storing said mobile identifying information and said object identifying information correspondingly;

15

when receiving a call for said mobile station identified by said mobile identifying information, retrieving said object identifying information corresponding to the mobile identifying information; and

transmitting retrieved object identifying information to said traffic control device; and said traffic control device generating movement information on said object identified by the object identifying information; and

20

transmitting generated movement information to said server; and said server converting received movement information into location area information; and

paging the mobile station on the basis of said location area information.

25

6. A method for communication in a communication system comprising: a server on a mobile network for communication with a mobile station; and a traffic control device for controlling an object comprising the steps of:

upon receiving an object identifying information for identifying said object from a transmitting device provided in said object, said mobile station transmitting to said server mobile identifying information for identifying said mobile station and received

10062797 "03302"

object identifying information; and

said server obtaining said mobile identifying information and said object identifying information;

storing said mobile identifying information and said object identifying information

5 correspondingly;

when receiving a call for said mobile station identified by said mobile identifying information, retrieving said object identifying information corresponding to the mobile identifying information; and

transmitting retrieved object identifying information to said traffic control device; and

10 said traffic control device generating movement information on said object identified by the object identifying information; and

transmitting generated movement information to said server; and

said server converting received movement information into location area information; and

15 paging the mobile station on the basis of said location area information.

7. A method for communication in a communication system comprising: a server on a mobile network for communication with a mobile station; and a traffic control device for controlling movement of an object comprising the steps of:

20 said server obtaining mobile identifying information for identifying said object and object identifying information for identifying said object; and

upon detecting a movement change of said object, said traffic control device generating movement information, transmitting to said server said object identifying information and generated movement information; and

25 said server receiving said movement information;

converting received movement information into location area information about an area within which said mobile station is located;

storing said object identifying information and said location area information correspondingly;

when receiving a call for said mobile station including said mobile identifying information, retrieving said location area information corresponding to the mobile identifying information; and  
 paging the mobile station on the basis of said location area information.

5

8. A method for communication in a communication system comprising: a server on a mobile network for communication with a mobile station; and a traffic control device for controlling movement of an object comprising the steps of:

upon receiving object identifying information for identifying said object from a transmitting device provided in said object, said mobile station transmitting mobile identifying information for identifying said mobile station and received object identifying information to said server; and

said server receiving said mobile identifying information and said object identifying information; and

upon detecting a movement change of said object, said traffic control device generating movement information, transmitting to said server said object identifying information and generated movement information; and

said server receiving said movement information;

converting received movement information into location area information about an area within which said mobile station is located;

storing said object identifying information and said location area information correspondingly;

when receiving a call for said mobile station including said mobile identifying information, retrieving said location area information corresponding to the mobile identifying information; and

paging the mobile station on the basis of said location area information.

9. A communication system comprising:

a traffic control device for controlling movement of an object; and

a mobile network; and

said mobile network comprising:

a mobile station;

a base station for communicating with said mobile station;

5 a switch for communicating with said base station;

a location server for communicating with said switch; and

an object information server for communicating with said location server and said traffic control device; and

10 said mobile station comprises means for receiving object identifying information for identifying said object and transmitting to said base station received object identifying information and mobile identifying information for identifying said mobile station;

said location server comprising:

15 means for storing said object identifying information and said mobile identifying information correspondingly, both of which sent from said mobile station;

means for retrieving and transmitting to said location server said object identifying information corresponding to said mobile identifying information ,when receiving from said switch an inquiry of location area information on said mobile station including the mobile identifying information; and

20 means for receiving from said object information server and transmitting to said switch said location area information on said object identified by the object identifying information; and

said object information server comprising:

25 means for receiving from said location server and transmitting to said traffic control device said object identifying information;

means for receiving from said traffic control device movement information on said object identified by the object identifying information;

means for converting received movement information into said location area information; and

means for transmitting converted location area information to said location server; and  
 said traffic control device comprising:

means for receiving from said object information server said object identifying  
 information and generating said movement information on the basis of received object  
 5 identifying information; and

means for transmitting generated movement information to said object information  
 sever.

10. A communication system comprising:

10 a traffic control device for controlling movement of an object; and  
 a mobile network; and

said mobile network comprising:

a mobile station;

a base station for communicating with said mobile station;

15 a switch for communicating with said base station;

a location server for communicating with said switch; and

an object information server for communicating with said location server and said  
 traffic control device; and

said mobile station comprises means for receiving object identifying information  
 20 for identifying said object and transmitting received object identifying information and  
 mobile identifying information for identifying said mobile station; and

said traffic control device comprising:

means for detecting movement change of said object and generating movement  
 information representing movement of the object; and

25 means for transmitting to said object information server the object identifying  
 information and the movement information; and

said object information server comprising:

means for receiving from said traffic control device said object identifying information  
 and said movement information and converting received movement information into

location area information representing an area within which said mobile station is located; and

means for transmitting to said location server said object identifying information and the location area information;

5      said location server comprising:

a first storing means for receiving from said object information server and storing correspondingly said object identifying information and said location area information;

10      a second storing means for storing correspondingly said object identifying information and said mobile identifying information, both of which sent from said mobile station; and

15      means for retrieving from said second storing means said object identifying information corresponding to said mobile identifying information, when receiving from said switch an inquiry of said location area information including the mobile identifying information.

20      11. The communication system of claim 10, wherein when not receiving from said transmitting device said object identifying information and moving into another location area, said mobile station transmits to said location server updated location information on the mobile station and said mobile identifying information; and when receiving said location area information and said mobile identifying information sent from said mobile station, said location server stores to said second storing means the mobile identifying information and the updated location area information correspondingly, instead of said object identifying information.

25

12. An information providing system for providing location information on a mobile station in a mobile network to a terminal comprising:

a location server in said mobile network for managing location of said mobile station; and

a location information server for carrying out communication with said terminal; and upon receiving from a transmitting device provided in an object identifying information for identifying an object, said mobile station transmits to said location server said mobile identifying information for identifying said mobile station and received object identifying information; and

said location server receives and stores correspondingly said object identifying information and said mobile identifying information sent from said mobile station; and

upon receiving from said terminal an inquiry of location information on said mobile station including said mobile identifying information, said location information server judges whether said object identifying information corresponding to the mobile identifying information is stored in said location server; and if the object identifying information is stored, transmits to said terminal boarding information representing that said mobile station is in the object.

13. The information providing system of claim 12, wherein said location information server further comprises means for identifying said mobile station using said mobile identifying information, carrying out communication with the mobile station, and obtaining from the mobile station said location information; and transmitting to said terminal said boarding information and the location information.

14. The information providing system of claim 12 further comprising an object information server for carrying out communication with a traffic control device which controls movement of said object; and

wherein upon receiving from said terminal an inquiry of location information including said mobile identifying information, said location information server transmits the mobile identifying information to said location server; and upon obtaining from said location server said location information, transmits to said terminal said boarding information and said location information; and



upon receiving from said location information server said mobile identifying information, said location server transmits to said object information server said object identifying information corresponding to the mobile identifying information; and upon receiving said object identifying information from said location server, said  
5 object information server obtains from said traffic control device said movement information on said object corresponding to the object identifying information; converts obtained movement information into said location information; and transmits the location information to said location information server via said location server.

10 15. The information providing system of claim 14, wherein said object information server stores said movement information obtained from said traffic control device and said object identifying information correspondingly; and when receiving from said location server said object identifying information, generates said location information on said object identified by the object identifying  
15 information on the basis of stored movement information on the object.

16. The information providing system of claim 15, wherein upon detecting a movement change of said object, said traffic control device updates and notifies to said object information server of said movement information; and  
20 said object information server receives the movement information and generates said location information on the basis the movement information.

17. The information providing system of claim 14, wherein when receiving from said terminal an inquiry of said location information on said mobile station, said  
25 location information server generates, on the basis of said movement information, estimated location information representing a future location on said mobile station and transmits said estimated location information to said terminal.

18. A method for providing location information of a mobile station in a mobile

10082797.022502

network to a terminal comprising the steps of:

said mobile station receiving, from a transmitting device provided in an object, object identifying information for identifying said object; transmitting to a server in said mobile network said object identifying information and mobile identifying

5 information for identifying said mobile station;

said server storing said object identifying information and said mobile identifying information correspondingly;

when receiving from said terminal an inquiry of location information on said mobile station including the mobile identifying information, judging whether said object

10 identifying information corresponding to the mobile identifying information is stored in said server; and

if the object identifying information is stored, generating and transmitting to said terminal boarding information representing that said mobile station is in said object.

15 19. A method for providing location information on a mobile station in a mobile network to a terminal comprising the steps of:

said server obtaining and storing correspondingly object identifying information for identifying an object and mobile identifying information for identifying said mobile station;

20 when receiving from said terminal an inquiry of location information on said mobile station including the mobile identifying information, retrieving said object identifying information corresponding to the mobile identifying information;

obtaining movement information on said object identified by the object identifying information;

25 converting obtained movement information into said location information; and transmitting said location information to said terminal.

20. A method for providing location information on a mobile station in a mobile network to a terminal comprising the steps of:

upon receiving, from transmitting device provided in an object, object identifying information for identifying said object, said mobile station transmitting mobile identifying information for identifying said mobile station and said object identifying information to a server in said mobile network;

- 5 said server storing said object identifying information and said mobile identifying information correspondingly;

when receiving from said terminal an inquiry of location information on said mobile station including the mobile identifying information, retrieving said object identifying information corresponding to the mobile identifying information;

- 10 obtaining movement information on said object identified by the object identifying information;

converting obtained movement information into said location information; and transmitting said location information to said terminal.

- 15 21. The method of claim 20, wherein when receiving said movement information, said server generates, on the basis of the movement information, estimated location information representing a future location of said mobile station and transmits said estimated location information to said terminal.

10082797-022503